

SOME NEW GENERA AND SPECIES OF NORTH  
AMERICAN PARASITIC BEES  
(Hymenoptera)

BY E. GORTON LINSLEY AND CHARLES D. MICHENER

*University of California, Berkeley*

*Protepeolus* Linsley and Michener, new genus

Female. Head nearly as wide as thorax, inner orbits slightly converging below; antennæ with pedicel as long as second flagellar segment; first flagellar segment almost as long as second and third together; labrum bituberculate; mandibles with an inner tooth before apex; maxillary palpi short, about one-seventh as long as labial palpi, arising from a tubercle, three-segmented, first segment about one and one-half times as long as second, third slender, slightly longer than first; labial palpi elongate, four-segmented, first segment a little more than twice as long as second, last two short, together scarcely half as long as second, fourth shorter than third. Axillæ not dentate; scutellum weakly bilobed; fore wings with three submarginal cells, all approximately equal in length on cubital side, first recurrent vein practically meeting second transverse cubital, second recurrent vein slightly basad of third transverse cubital, marginal cell rounded and separated from costa at apex, a little more than two-thirds as long as discoidal cell; middle and hind legs robust, their tibial spurs rather short, stout; pulvilli nearly as long as the claws, enlarged at apex. Abdomen with a deep, transverse, ventral constriction near base, posterior face of constriction with an arcuate carina enclosing a semi-lunar area, a short distance behind which is a transverse, impressed line (suture?) extending completely across the sternite; fourth and fifth sternites truncate at apex; sixth exerted, tapering and narrowly rounded apically; fifth tergite medially emarginate at apex with a small, transverse, shining, false pygidial area within the emargination; sixth tergite greatly reduced in size, with a median ligulate, pygidial process, on each side of which is a row of stout, parallel spines interspersed with bristles.

Genotype: *Protepeolus singularis* n. sp.

This genus differs from all others known to the writers by the peculiar ventral constriction of the abdomen. Interpretation of the sclerites in this region is very difficult on the basis of the unique type, and it is not certain whether the first sternite ends in the constriction or at the transverse line behind the enclosed, semi-lunar area (see figure). The nearest relative of *Protepeolus* appear to be the South American *Isepeolus* and

*Leiopodus*, but it may be distinguished from these by the three-segmented maxillary palpi and the position of the second recurrent vein which is nearly interstitial with the second transverse cubital vein. From *Viereckella*, with which it agrees in the exposed, tapering, sixth abdominal sternite of the female, *Protepeolus* may be separated by the scale-like (rather than plumose) abdominal hairs, the ligulate pygidial process of the female, and the three-segmented maxillary palpi.

### *Protepeolus singularis* Linsley and Michener, new species

Female. Black, with small amounts of red on legs and body, clothed with brownish and white pubescence which forms a pattern of spots and bands on the thorax and abdomen. *Head* with transfacial line considerably longer than facial line, surface shining, finely and not very densely punctured, pubescence sparse, whitish, except on vertex and frons where it is brown, short; antennæ suffused with reddish, flagellum darker above, scape red basally; clypeus with anterior margin narrowly red; labrum reddish; mandibles with basal two-thirds red. *Thorax* with punctation, where visible, somewhat coarser than that of head, tegulæ and tubercles red, scutellum, axillæ, and metanotum dark reddish; pronotum with a narrow posterior margin of white pubescence; scutum margined with white pubescence, clothed with dark brown hairs which are sparser posteriorly, anterior half of disk with a clearly defined, longitudinal, cream-colored fascia which is swollen posteriorly and slightly broadened anteriorly to meet the marginal band; the marginal band, adjacent to tegulæ, produced to a point which extends inward and forward; scutellum clothed with brown pubescence, with a narrow, median, longitudinal band of white; axillæ and metanotum with some whitish pubescence; sides of thorax clothed with white hairs intermixed with patches of brown; wings grayish, a dusky streak along costal margin beyond marginal cell; legs red, coxæ blackish, under side of anterior femora suffused with blackish, underside of middle and hind femora at base, and most of inner side of hind tibiæ, including spurs, black. *Abdomen* black, apical margins of segments, first two segments at sides, sixth tergite at base, and most of sixth sternite, reddish; tergites very finely punctured, the fifth more closely so than the preceding; first tergite with a broad, transverse, cream-colored band of pubescence which is abruptly broken at middle; second and third tergites with a similarly colored basal fascia, that of the third tergite narrowed near the lateral margin; fourth tergite with areas of whitish pubescence at sides; fifth tergite with the apical portion slightly elevated, clothed with black hair, false pygidial area glabrous and impunctate, margined anteriorly by

a low carina; pygidial process of sixth tergite shining, with a low, median, longitudinal ridge; first to third sternites with whitish fasciæ on disk, those of second and third segments interrupted at middle; concavity at base of second sternite glabrous, impunctate, polished. Length 9.5 mm., anterior wing 6 mm.

Holotype female (No. 4344 Calif. Acad. Sci. Ent.), captured at Albuquerque, New Mexico, September 1-3, 1935, on *Sphaeralcea* (Michener).

This fine species may be easily distinguished from all other known Nomadine bees by the generic characters.

#### Hexepeolus Linsley and Michener, new genus

Head nearly as wide as thorax, inner orbits converging below; antennæ with pedicel nearly as long as second flagellar segment, first flagellar segment distinctly longer than second; mandibles with inner margin more or less evenly rounded, simple, without an inner tooth; maxillary palpi four-fifths as long as labial palpi, six-segmented, first segment slightly more than half as long as second, remaining segments becoming perceptibly shorter and more slender to the apical segment; labial palpi four-segmented, first segment elongated, surpassing in length the remaining segments taken together, second segment approximately one-third as long as first, third segment about three-fifths as long as second, fourth segment subequal in length to third. Axillæ not dentate; scutellum convex, longitudinally impressed along median line, feebly bilobed; forewings with either two or three submarginal cells, if two, the cells are of about equal length on the cubital side, if three, the first cell is longer on cubital side than the second or third, the second smaller than the third and greatly narrowed anteriorly, marginal cell rounded and separated from costa at apex, a little shorter than discoidal cell; middle and hind legs only moderately robust, tibial spurs slender, pulvilli short, not distinctly enlarged at apex. Abdomen with tergites broadly depressed and densely pubescent along apical margin.

Female. Antennæ with first flagellar segment only a little longer than second; fifth abdominal tergite with a small false pygidial area; sixth tergite with a broadly rounded pygidial area, margined laterally by a carina; sixth sternite with a median keel between two concavities, apex bilobed, margined externally by a comb-like row of curved spines which become shorter, finer, laterally where they extend forward along the outer margins of the concavities.

Male. Antennæ with first flagellar segment subequal in length to the two following together; seventh abdominal tergite with a projecting, apically rounded, pygidial plate, the dorsal surface

of which is flattened, bounded by a carina; sixth sternite with a broad, transverse, discal groove.

Genotype: *Hexepeolus mojavensis* n. sp.

This genus presents the facies of *Argyroselenis*, *Epeolus*, or *Triepeolus*, sharing with them the apically rounded marginal cell which is distinctly separated from the costa. It differs markedly from these groups, however, in the long, six-segmented maxillary palpi, simple axillæ, and structure of the abdomen in the female (six visible sternites). In these last characters *Hexepeolus* agrees with *Nomada* and *Gnathias*, but may be distinguished from them by the closely appressed lateral margins of the first tergite (in *Nomada* and *Gnathias* these margins project as conspicuous, transparent, ventral flaps), the pubescent fasciæ of the abdomen, and the bilobed sixth sternite of the female.

The number of submarginal cells in the forewings is variable, several examples having only two such cells in one or both wings, although the normal number appears to be three. A similar condition exists in many other species of bees which are normally three-celled.

*Hexepeolus mojavensis* Linsley and Michener, new species

Black, sparsely clothed with white pubescence, denser on face, pleura, and venter, forming patches on notum and fasciæ on abdominal tergites. *Head* with transfacial line longer than facial line; antennæ black, suffused with reddish, particularly along under side of flagellum; upper frons and vertex moderately coarsely, subcontiguously punctured; face densely clothed with long white hairs; clypeus broadly truncate at apex, surface finely, closely punctured on disk, more coarsely at sides; labrum coarsely, irregularly punctured, with a longitudinal carina becoming evanescent at base; mandibles with apices reddish; segments of palpi with pale annulations. *Thorax* with scutum coarsely, closely punctured, the punctures averaging less than one puncture width apart, surface very finely, inconspicuously clothed with short, suberect, pale hairs in addition to the conspicuous white patches; pronotum, above tubercles, with a patch of dense white pubescence, tubercles coarsely punctured, clothed with white hairs; scutellum a little more closely punctured than scutum, with a dense patch of white hairs at the anterior angles; metanotum coarsely, closely punctured, clothed with long, white hairs; propodeum with triangular area nearly nude, finely, closely punctured, with a few oblique rugæ at base, remaining surface of propodeum coarsely, closely punctured, moderately densely clothed with long, white hairs;

mesepisterna very coarsely, closely punctured, irregularly clothed with suberect, white hairs; tegulæ reddish; wings lightly infuscated, veins brownish; legs clothed with moderately short, appressed hairs. *Abdomen* with dorsal surface clothed with fine, inconspicuous, prostrate, black hairs, apical margin of segments with broad bands of white pubescence, interrupted at middle to form separate fasciæ, first segment with a white patch on each side at base in addition to fasciæ; tergites coarsely punctured, the punctures averaging less than one puncture width apart; the depressed, pubescent apical margins more finely, closely punctured; sternites coarsely, closely punctured, moderately densely clothed with white hairs, broad apical margin of sternites reddish.

Female. Pronotum with tubercles reddish; scutum with a dense patch of white pubescence along median line from middle of disk to anterior margin, a short line on each side anteriorly, a small patch adjacent to tegulæ, and similar patches at posterior angles. Legs red, suffused with variable amounts of black on femora and tibiæ; abdomen red, first five tergites fasciate, the fascia of the fifth segment continuous; fifth tergite piceous to black, more uniformly punctured than preceding segments, the punctures moderately coarse and subcontiguous except on the small, transverse, false pygidial area, which is finely, shallowly punctured and densely clothed with fine, pale, silken pubescence; sixth tergite moderately densely clothed with white hairs except on pygidial area, which is finely, closely, shallowly punctured and sparsely clothed with very fine, short, inconspicuous, pale hairs; processes on each side of sting strap-like, black, densely pubescent; sixth sternite and margins of preceding sternites polished. Length 8 mm., anterior wing 6.5 mm.

Male. Pronotal tubercles black; scutum lacking median white patch, anterior angles with a vague spot of white hairs; legs black, with small amounts of red on femora, tibiæ, and tarsi; abdomen black, sides of first tergite reddish, tergites five and six with continuous white bands, that of the fifth notched at the middle; pygidial plate of seventh segment reddish. Length 8 mm., anterior wing 6.5 mm.

Holotype female (No. 4345, Calif. Acad. Sci. Ent.), captured at the junction of Deep Creek and Mojave River, Mojave Desert, San Bernardino Co., California, April 26, 1936 (Linsley). Allotype male (No. 4346, Calif. Acad. Sci. Ent.), from the same locality May 6, 1936 (Linsley). Paratypes, three females and twelve males with the same data as the allotype, one pair of which will be deposited in the collection of Dr. T. D. A. Cockerell at Boulder, Colorado, a pair in the Michener

collection, the remainder will be retained in the Linsley collection. Additional paratypes (5 ♀ ♀ ; 6 ♂ ♂ ) from the same locality and date are in the collection of Mr. P. H. Timberlake, at the Citrus Experiment Station. All examples were visiting flowers of *Eriodictyon trichocalyx*.

This species is closely related to the following and differs in the smaller size, dull, closely punctate frons, and the black legs of the male.

### *Hexepeolus rhodogyne* Linsley and Michener, new species

Black, sparsely clothed with white pubescence, denser on face, pleura, and venter, forming patches on notum and fasciæ on abdomen. *Head* with its transfacial line longer than its facial line; face densely clothed with white pubescence; upper frons below ocelli polished, moderately coarsely but not closely punctured, the punctures averaging one or more puncture widths apart; clypeus broadly truncate at apex, surface finely, closely punctured on disk, more coarsely at sides; labrum coarsely, irregularly punctured, with a longitudinal carina which becomes evanescent at base; apical half of mandibles reddish; segments of palpi with pale annulations. *Pronotum*, above tubercles, with a patch of dense, white hair, tubercles coarsely punctured, clothed with white pubescence; scutum coarsely, closely punctured, the punctures averaging less than one puncture width apart and finer than those of vertex, surface finely, inconspicuously clothed with short, pale, suberect hairs in addition to conspicuous white patches at anterior and posterior angles; scutellum more coarsely punctured than scutum; metanotum coarsely, closely punctured, clothed with long, white hairs; propodeum with triangular area nude, finely, closely punctured, with a row of oblique rugæ at base, remaining surface of propodeum coarsely, closely punctured, moderately densely clothed with long, white hairs; mesepisterna coarsely, closely punctured, clothed with suberect white hairs; tegulæ red; wings lightly infuscated; legs red, clothed with moderately short, white hairs. *Abdomen* clothed with fine, prostrate, black hairs on dorsal surface, depressed apical margin of segments with broad bands of dense white pubescence, interrupted at middle to form separate fasciæ; tergites coarsely punctured, the punctures averaging less than one puncture width apart; sternites densely clothed with white pubescence, closely punctured except for the polished, reddish, apical margins.

*Female*. Antennæ red, apical segments of flagellum dusky; tubercles of pronotum reddish; scutum with at most a feeble median white patch of pubescence; abdomen red with third and fourth tergites darker, the fifth and sixth tergites piceous except for pygidial and false pygidial areas; fifth tergite with a small,

shallowly punctured, false pygidial area, which is clothed with fine, pale, silken pubescence; sixth tergite moderately densely clothed with white hairs except for pygidial area which is very finely, shallowly, closely punctured and sparsely clothed with fine, short, inconspicuous pale hairs; sixth sternite polished. Length 9 mm., anterior wing 7.3 mm.

Male. Antennæ black, lightly suffused with reddish, especially along under side of pedicel and first flagellar segment; tubercles of pronotum black; abdomen black, the sides of the first tergite reddish, the white band of tergite five broken at middle, that of tergite six continuous; pygidial plate of seventh segment black. Length 10 mm., anterior wing 7.3 mm.

Holotype female (No. 4347, Calif. Acad. Sci. Ent.), taken two miles east of Cathedral City, Riverside Co., California, April 10, 1936 (Linsley), and allotype male (No. 4348, Calif. Acad. Sci. Ent.), from Palm Canyon, Borego Valley, San Diego Co., California, March 29, 1936 (Linsley). Paratypes, two males, taken at the same time and place as the allotype, in the collection of Mr. P. H. Timberlake. All four examples were visiting flowers of *Larrea glutinosa*.

The differences between this and the preceding species may be brought out in the following table:

FEMALES

Upper frons, below ocelli, dull, uniformly closely, subcontiguously punctured, the punctures averaging much less than one puncture width apart; antennæ black, lightly suffused with reddish on under side of flagellum. 8 mm. Mojave Desert, California.....	<i>mojavensis</i>
Upper frons, below ocelli, shining, irregularly, not closely punctured, the punctures averaging one or more puncture widths apart; antennæ red. 9 mm. Colorado Desert, California.....	<i>rhodogyne</i>

MALES

Upper frons, below ocelli, dull, uniformly closely, subcontiguously punctured, the punctures averaging much less than one puncture width apart; legs black, with small amounts of red; pygidial area reddish. 8 mm. Mojave Desert, California.....	<i>mojavensis</i>
Upper frons, below ocelli, shining, irregularly, not closely punctured, the punctures averaging one or more puncture widths apart; legs red; pygidial area black. 10 mm. Colorado Desert, California.....	<i>rhodogyne</i>

*Paranomada* Linsley and Michener, new genus

Female. *Head* distinctly narrower than thorax, inner orbits slightly converging below; antennæ short, flagellar segments subequal in length, wider than long, the first slightly longer than the following; vertex polished, impunctate; frontal carina wanting; mandibles simple; maxillary palpi shorter than second segment of labial palpi, five-segmented, basal segment very short, second segment as long as the following two together, third segment two-thirds as long as second, fourth segment one-half as long as third, fifth segment slightly shorter than the fourth, the two together approximately as long as third segment; labial palpi four-segmented, first segment surpassing in length the remaining segments taken together, second about one-half as long as first, last two segments subequal in length, together about one-half as long as second. *Thorax* broad and dorso-ventrally compressed; scutum more or less flat, highly polished; scutellum large, flat, level with scutum, also highly polished; tegulæ large, shining; mesosternum broad, flat, shining, with a pair of sutures running anteriorly from mid coxæ and meeting at about middle of segment; coxæ drawn out externally in the form of a prominent lamella, fore coxæ not spined, middle and hind coxæ with a dorsal carina; legs short, stout, pubescent, femora flattened; wings infuscated, anterior pair with three submarginal cells. *Abdomen* polished, tergites two to four with broad, continuous, bands of white pubescence along apical margins, white band of fifth tergite interrupted at middle, sixth tergite with a broadly truncate pygidial area; sternites polished, moderately pubescent, sixth sternite retracted, represented externally only by a pair of projecting, slightly curved processes, bearing on inner sides a few inconspicuous spines.

Genotype: *Paranomada nitida* n. sp.

This genus is apparently related to the West Indian *Nomadoma* Rohwer<sup>7</sup> with which it agrees in the smooth, shining integument, flat scutum and scutellum, indistinct frontal carina, and fasciate abdomen, but differs in the short five-segmented maxillary palpi, dusky wings with three submarginal cells, and short flagellar segments of the antennæ (the first scarcely longer than the second segment). From the Argentinian *Brachynomada* Holmberg<sup>8</sup> which has five-segmented maxillary palpi, *Paranomada* may be distinguished by the absence of a frontal suture, the broad, flat, highly polished thorax, and the short flagellar

<sup>7</sup> Rohwer, S. A., 1911, Ent. News 22:24-27, figs.

<sup>8</sup> Holmberg, E. L., 1886, Ann. Soc. Ci. Arg. 22:239.



segments of the antennæ. The peculiar structure of the coxæ, which are drawn out externally in the form of a conspicuous lamella, is unlike that in any other Nomadine bees which we have seen.

*Paranomada nitida* Linsley and Michener, new species

Female. Reddish brown, shining, clothed with white pubescence. *Head* nearly glabrous on vertex; antennæ piceous, scape and pedicel reddish; frons and clypeus irregularly clothed with white hairs, surface with a few scattered punctures; labrum very densely pubescent; mandibles reddish, edges piceous. *Thorax* shining; pronotal tubercles clothed with white pubescence; scutum nearly glabrous and impunctate, disk suffused with brownish; scutellum glabrous, impunctate; metanotum feebly shining, finely, closely punctured, densely pubescent at sides; propodeum with triangular area glabrous at middle, densely pubescent at sides, remaining dorsal surface, except a small area on each side of triangle, densely clothed with prostrate white pubescence; mesepisterna densely clothed with white hairs; anterior coxæ and mesosternum moderately sparsely punctured and pubescent; legs shining, femora sparsely, but distinctly punctured, sparsely clothed with long, white pubescence, tibiæ and tarsi rather densely pubescent; wings brownish, with a pale area before apex. *Abdomen* shining, first tergite glabrous, very finely, sparsely punctured except apical depression which is moderately finely punctured and sparsely clothed with short, fine, inconspicuous brownish hairs, second tergite finely, sparsely punctured and pubescent, apical depression and lateral margins with a broad band of white pubescence, interrupted at middle, third and fourth segments similarly punctured, although a little more densely pubescent, apical white fasciæ continuous; apex of fifth tergite fine, closely punctured and pubescent; pygidial area with a piceous, elevated margin and a median, longitudinal ridge; sternites moderately clothed with long, white hairs, denser on fifth segment. Length 7.5 mm., anterior wing 6 mm.

Holotype female (No. 4349, Calif. Acad. Sci. Ent.), from Phoenix, Arizona, October 23, 1924 (J. D. Gunder), in the collection of the California Academy of Sciences. The writers are indebted to Mr. E. P. Van Duzee for the privilege of studying this interesting species.

*Paranomada nitida* shares many characters with the West Indian *Nomadosoma pilipes* (Cresson),<sup>9</sup> from which it may be distinguished by the five-segmented maxillary palpi, infuscated

<sup>9</sup> Cresson, E. T., 1865, Proc. Ent. Soc. Phil. 4:183,

wings, three submarginal cells, and the arrangement of the abdominal fasciæ. In *N. pilipes* there are pale fasciæ on the middle of the first, second, fourth, and fifth tergites, that of the fourth segment being interrupted at the middle.

---

NOTES ON THE DYTISCID BEETLE, *AGABUS*  
*LINEELLUS* (LEC.)

*Agabus lineellus* (LeConte) seems to be of such scarcity, at least in collections, as to merit the following notes.

On March 29, 1936, while collecting on the University Farm at Davis, California, I had the good luck to take eight specimens of *Agabus lineellus*. The creek from which these specimens were obtained runs along the southern border of the farm. At that time of the year the creek consisted of muddy, stagnant pools that were scattered along its course. There happened to be an old burlap sack lying in the edge of one of the rather large pools and on pulling this out I discovered that a number of dytiscids had been hiding under it. These beetles became active at once and started crawling back into the water. However, I succeeded in capturing eight of them. These specimens remained in my collection until a few months later when I gave four of them to Hugh B. Leech who identified them as *Agabus lineellus* (Lec.).

The specimens agree perfectly with the description in Dr. H. C. Fall's paper of 1922, "A Revision of the North American Species of *Agabus*". They are readily separable from *A. disintegratus* (Cr.) which is the only other vittate species of the genus known to occur in California.

To show past recorded history of this species the following extract from Dr. Fall's paper is cited . . . "This very rare species is represented in the LeConte collection by the unique type taken by Murray in California, precise locality not stated. Aside from the type I have seen only a single example collected by G. R. Pilate at Mills College, California and sent me for identification by Mr. Dury, who retains a second specimen in his own cabinet."

Out of the series of eight specimens, three males and one female are in the H. B. Leech collection, two males are in Dr. E. C. Van Dyke's collection and a male and female are retained in my own collection.—Burdette E. White, University of California.